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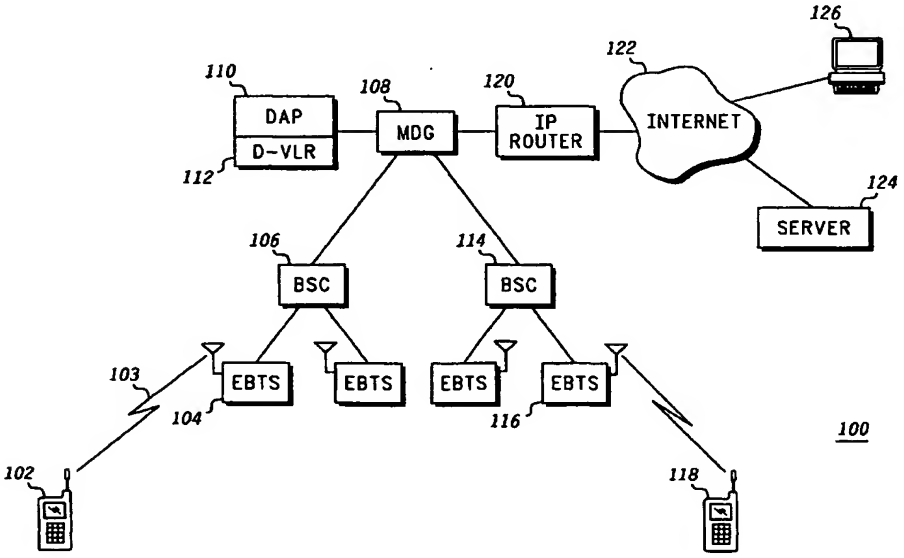
(54) Title: METHOD FOR PERFORMING WIRELESS MOBILE INSTANT MESSAGING



(57) Abstract: A first mobile station (102) is used to send a message to a second mobile station (118). The user of the first mobile station designates the second mobile station as the target, and composes a message either by recording speech or entering a text message on the first mobile station. The mobile station then transmits the message and target identifier to a fixed equipment network including an EBTS (104), BSC (106) and a mobile data gateway (108). The MDG uses dispatch calling resources to route the message without queuing or storing the message by obtaining the present location of the second mobile station from a dispatch visit location register (112). The MDG then routes the message similarly to setting up a dispatch call between the first and second mobile stations.

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METHOD FOR PERFORMING WIRELESS MOBILE INSTANT MESSAGING

Technical Field

This invention relates in general to wireless mobile communication systems, and more particularly to methods of sending messages between mobile communication devices and between mobile communication devices and clients using data network equipment.

Background of the Invention

Wireless mobile communications has had a profound impact on the way many people conduct business, and it has provided a great convenience to the general public. In some situations, however, it may be inappropriate or otherwise undesirable to use a mobile communication device, such as during an important business meeting, or any other time when it would be considered disruptive. Yet it may be desirable to transmit or receive a short non verbal message that does not necessarily require a real-time response, or any response at all. This type of messaging is done regularly between fixed computing stations, such as by electronic mail, or to a mobile device such as a pager. Some methods even provide for pseudo real-time response, such as the so called online chat where multiple users can simultaneously engage in a discussion with low apparent latency. Instant messaging, as it has come to be known, is a variety of the online chat where discussion is between two people located at remote stations.

Instant messaging and online chat in general involve activating a software program at a computer that is connected to a network. The software program is an instant messaging "client" which runs on a general purpose computer connected to a network. Upon activation, the instant messaging client requests the users account information, and connects to a messaging server. The messaging client relays the account information to the messaging server, along with the present network address of the machine currently being used for the present instant messaging session. This allows the user to use different machines at different times with the same instant messaging account, provided that the machine has a copy of the instant

messaging client program and is connected to the network. An instant message is an alpha-numeric text string composed by a first user, typically in a text entry window in the program's user interface, that is sent to a second user or a group of users over the instant messaging server. The server forwards this message to the final recipient's client and the client displays the message as soon as it is received.

The fact that conventional instant messaging services rely on servers that queue messages indicates that there is always the server processing delay, which, during peak times of messaging traffic can be noticeable. Other types of messaging, such a paging and electronic mail (email) also suffer from inherent delivery latency during periods of peak network activity. Wireless messaging such as paging and email offer the benefit mobility and can present a minimal disturbance, unlike receiving a mobile phone call where the user engages in a conversation with the calling party upon receiving a call. Therefore there is a need for a wireless instant messaging system for mobile clients that does not delay messages, even during times of peak traffic.

Brief Description of The Drawings

FIG. 1 shows a communication system for performing wireless instant messaging, in accordance with the invention;

FIG 2 shows a flow chart diagram of a method of performing wireless instant messaging between mobile communication devices, in accordance with the invention; and

FIG. 3 shows a diagram of a typical data packet including a header and a payload;

FIG. 4 show a flow chart diagram of a method of determining if a mobile station is presently online, in accordance with the invention;

FIG. 5 shows a flow chart diagram of a method of performing wireless instant messaging between a mobile station and a network chat client, in accordance with invention; and

FIG. 6 shows a flow chart diagram of a method of performing wireless instant messaging between a mobile station and a network chat client, in accordance with invention.

Detailed Description of a Preferred Embodiment

While the specification concludes with claims defining the features of the invention that are regarded as novel, it is believed that the invention will be better understood from a consideration of the following description in conjunction with the drawing figures, in which like reference numerals are carried forward. A brief description of the prior art is also thought to be useful.

As mentioned above, prior art messaging for wireless systems, and for many wired networks systems, is server queued. By server queued it is meant that the message sent from the sender's equipment is temporarily stored on a server before it is delivered. Examples of such systems include email, paging, and internet chat messaging. A chat server may also duplicate messages so that they may be routed to multiple users involved in the same discussion. Being server based, the messaging network delay is determined by the amount of dedicated resources and the volume of messaging traffic. Obviously as the traffic volume increases, the more demand there is on system resources, and at some point delays begin to be experienced in message delivery. Furthermore, many messaging systems are blind, such as paging systems, meaning that the sender has no way of knowing if the intended receiver actually received the message.

The present invention mitigates these problems by avoiding the use of a server, and providing feedback as to whether or not the intended receiver actually received the sent message. This is accomplished by use of a direct client to client communication over the network. In the preferred embodiment the message is transmitted through the system without being queued at any server. One benefit of using a dispatch channel instead of a more conventional duplex channel is that roughly half the system resources used for a duplex connection are utilized since only a half duplex connection is needed at any one instant.

Referring now to FIG. 1, there is shown a communication system 100 for performing wireless instant messaging, in accordance with the invention. A mobile communication device or mobile station 102 is shown, connected over an air interface 103 to a fixed equipment network including an enhanced base transceiver (EBTS) 104. The mobile station comprises a display means for displaying information such as text and various icons, and an input means such as an alpha-

numeric keypad. It is a mobile wireless communication device, meaning that mobile station may move from location to location within a serving area and maintain contact with the fixed equipment network by handing over to different base sites, as is well known in the art. Furthermore, the mobile station is capable of making both dispatch and telephone calls, such as any of the communication devices sold under the trade name iDEN, manufactured by Motorola, Inc. These devices have a push-to-talk feature that allows the mobile station to engage in dispatch calls with one or more other stations. The EBTS is operably connected to a base site controller (BSC) 106, which controls one or more EBTS units on a given site to establish a serving cell. The BSC in turn is operably connected to, among other network devices, a mobile data gateway (MDG) 108. The BSC may also be operably connected to, for a example, a mobile switching center (not shown), as is well known in the art, for establishing duplex telephone calls over a public switched telephone network. By dispatch call it is meant any half duplex type of communication where the parties alternatively speak and listen. This can occur between two mobile operators, or from one to many mobile operators in a so called fleet mode, as is known in the art. As used here, the term should not be confused with the more common, and more narrow meaning as used in, for example, public safety radio systems.

The MDG 108 is operably connected to a dispatch application processor (DAP) 110, which is a communication agent processor for facilitating dispatch calls. These calls are half duplex, where only one station talks at a time, and the receiving stations can only listen. A dispatch call may be between two or more stations. When a mobile station user wishes to initiate a dispatch call, the system identifier of the station the user wishes to call, or the talk group identifier the user wishes to speak in is selected at the user's station. Upon engaging the push-to-talk button, the station sends the information to the DAP, which quickly locates the serving cell(s) of the target stations by examining a dispatch visit location register (D-VLR) 112. The D-VLR works substantially similar to that of a visit location register used in mobile telephone systems to keep a timely record of the serving cell in which each connected mobile station is presently located. This facilitates quick routing of dispatch calls to the cell or cells of the other stations which a calling

station is calling. As mobile stations change locations, their cell affiliation is updated in the D-VLR. The MDG may also be connected to outside networks through, for example, an IP router 120, which connects the wireless system 100 with a data network such as, for example, the Internet 122, where there are other servers 124 and network chat client machines 126.

Referring now to FIG. 2, there is shown a flow chart diagram 200 of a method of performing wireless instant messaging between mobile communication devices, in accordance with the invention. The method is explained with references to FIG. 1. At the start 202, a first mobile station, such as mobile station 102, is powered and connected to the wireless communication system over an air interface 103. This means the mobile station 102 is registered for service, and its present cell location is recorded in the D-VLR 112. When the user of the first mobile station decides to send an instant message, the user uses the mobile station to compose a message. The mobile station comprises a keypad and display, as is well known in the art, to facilitate the entry of alphanumeric information, and the user composes an alphanumeric message (202). However, it is contemplated that the message may be composed by recording the users voice speaking a short message, and digitally encoding the recorded voice message for transmission. The user must also select a target (206); a second mobile station used by the person to whom the user wishes to send the instant message. The user may select a from a database of target identifiers stored in a memory, preferably by selecting an alias associated with the target identifier, or the user may enter the target identifier directly. The target identifier is the identifier the communication system uses to identify to which mobile station the user intends to send the message, and my be, for example, an internet protocol (IP) address. Then the user uses the mobile station to transmit (208) the message. This may be done by, for example, pressing a push-to-talk button on the mobile station. The target identifier and subsequently, the message, are then transmitted to the fixed equipment network. The fixed equipment network includes all non-mobile components of the communication systems, including the EBTS 104, BSC 106, MDG 108, DAP 110, and so on. In the preferred embodiment, the air interface 103 is a time divisioned interface, meaning that the

mobile station transmits and receives data in specified time slots, as is well known in the art.

The fixed equipment first receives the target identifier. The information is received in packets, such as packet 300 shown in FIG. 3, as is well known in the art, with a header 302 in each packet indicating what type of data is included in the payload 304 of the packet. Initially the information received from the mobile station indicates to the fixed equipment network that the mobile station is attempting to transmit an instant message by the designation in the header of the incoming packets. The fixed equipment network routes the incoming packets to the MDG 108. The MDG receives the information, sees that the mobile station is attempting to send an instant message, looks up the target identifier in the D-VLR to see if the target, a second mobile station, such as mobile station 118, is presently available (210), and if so, to which cell it is presently connected. The MDG then routes the information to a second EBTS 116 (214), which is operating the serving cell in which second mobile station 118, the target, is located. The EBTS 116 pages the second mobile station to alert it to the outgoing data, and which channel the data will be transmitted (216). The second mobile station tunes to the appropriate channel and begins receiving the instant message. While it is receiving the instant message, or shortly after receiving the message, the second mobile station sends an acknowledgement back to the first mobile station (220), and displays the received message in an alphanumeric capable display (222). Preferably, the second mobile station alerts the user an audio or visual alert, or both, upon receiving the message. The message may be displayed at the users request upon perceiving the alert, or it may be displayed automatically. Presently, the instant message is finished (224).

There are a few ways of handling the situation if the second mobile station is not presently available when the first mobile station begins to send the message. For one, the first mobile station may "ping" the second mobile station prior to sending the message, or even prior to the first user composing the message, as illustrated in FIG. 4. For example, the first user may be curious as to whether the second mobile station is in use, and hence able to receive an instant message. The first user merely selects the identifier of the second mobile station from within an

appropriate operating mode of the first mobile station (400), and takes some action, such as pressing a push-to-talk button. The identifier is sent to the MDG through the fixed equipment network (402). The MDG then looks for the identifier in the D-VLR (404). If the MDG finds no record of the second mobile station in the D-VLR, it may return a failure message (406) to the first mobile station. This is the same as would preferably happen in the previous case had the MDG not found the second mobile station's identifier in the D-VLR when the whole message was attempting to be sent to the second mobile station. If the target identifier is found, the MDG returns an acknowledgment (408), and the user can then proceed to compose a message. In an alternative embodiment, the user can compose the message and if the second mobile station is not available, the first mobile station may automatically repeat attempting to send the message at preselected intervals. An alternative method occurs when the second mobile station 118 is listed in the D-VLR, but does not respond, either when paged by the EBTS 116, or after the message is transmitted. Preferably, when the first mobile station transmits the message, it begins a timer. If after a preselected period of time there has been no acknowledgement received, the first mobile station displays a fail message to the user. Because of the very low latency in transmitting a message from one mobile station to another with this method over such a fixed equipment network, it is contemplated that no more than a few seconds will be needed to receive a proper acknowledgement. So if, for example, 5 seconds have elapsed and no acknowledgement has been received, the first mobile station will fail the transmission.

It is also contemplated that the user of a mobile station may desire to send a message with a fixed terminal, or other terminal or station over public network, such as the Internet. As shown on FIG. 1, the MDG is connected to a an IP router 120, which connects the wireless communication system to the Internet 122. Also connected to the Internet is, for example, a chat server 124, and a computer running a chat client application program 126. The chat client application program allows the user of the client program to log onto the chat server, preferably as soon as it is turned on, over the Internet using a unique name or identifier. Other users can log onto the chat server with similar programs and exchange messages over the server

with the each other. The server receives message from one client, queues the message, then forwards the message to all designated targets, in turn. The chat server works as a first in, first out queue for messages received from client machines.

In the first case, a mobile station 102 is used to send a message to a network chat client 126. FIG. 5 shows a flow chart diagram of a method in accordance with the invention for accomplishing this. First, as before, the user composes a message (500), which may be a recorded voice message or an alphanumeric message, and the chat client identifier, such as an IP address, or a unique name or other identifier used by the chat server. Of course, the network address of the chat server will also be included, although this may be provided by the messaging application program on the mobile station. The mobile station sends the message to the fixed equipment network, which recognizes the designation as being to a target outside the wireless communication network, and routes (502) the message to the IP router 120. The IP router forwards the message to the chat server 124 over the Internet, which receives the message (504). Upon receiving the message, the chat server looks up the designated chat client to see if the particular chat client is presently logged onto the chat server (506). If not, a fail message is returned, and routed back to the mobiles station (508). If the chat client is online, the message is forwarded to the chat client.

FIG. 6 shows a flow chart diagram a method in accordance with the invention of the reverse direction, when a chat client sends a message to a mobile station. First the chat client 126 logs onto the chat server 124 over the Internet. Then the user of the chat client composes and sends a message (602), designating it appropriately. This includes designating the particular wireless communication system, although this may be done simply by use of an I address of the particular IP router/MDG. . The chat server recognizes the designation as one of a mobile station, and routes the message to the IP router, which forwards it to the MDG (604). The MDG then looks for the designated mobile station in the D-VLR (606). If the mobile station is not listed presently, a fail message may be returned to the chat client (608). Otherwise, the message is forwarded to the serving cell in which the designated mobile station is presently located (610), and the message is received

at the mobile station (612) as described hereinabove. It is also contemplated that the mobile station may generate an acknowledgement upon receiving the message, and send it back to the network chat client over the network. It is still further contemplated that if no response is received upon sending a message from either the mobile station of the chat client, the device attempting to send the message may display a fail message within a period of time.

Thus, the present invention solves the problem of latency and the expense of adding servers to avoid latency by sending message between mobile stations similarly to dispatch calls, which are not queued. This is accomplished by the use of presently existing resources in a new way. Particularly, the use of the mobile station to compose a message, and transmit the entire message, for example, at the push of a button, without storing the message in the system. The message may be recorded voice or alphanumeric text. Furthermore the present invention allows mobile station to exchange message with network chat clients, over the Internet. While the preferred embodiments of the invention have been illustrated and described, it will be clear that the invention is not so limited. Numerous modifications, changes, variations, substitutions and equivalents will occur to those skilled in the art without departing from the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

CLAIMS

1. A method for performing wireless mobile instant messaging, comprising;

composing a message at a first mobile communication device;

providing a target identifier corresponding to a second mobile communication device, performed at the first mobile communication device;

transmitting the message and the target identifier to a fixed equipment network;

determining, at the fixed equipment network, a target cell in which the second mobile communication device is presently located, without queuing the message;

routing the message to the target cell over the fixed equipment network;

transmitting the message to the second mobile communication device; and

displaying the message at the second mobile communication device.

2. A method for performing wireless mobile instant messaging as defined in claim 1, further comprising, if the second mobile communication device does not receive the within a preselected period of time after transmitting the message, displaying a failure message at the first mobile communication device indicating that the message was not received.

3. A method for performing instant messaging between a mobile communication device, operating in a mobile communication system, and a data network client operably connected to a data network, the method comprising:

authoring a message at the mobile communication device;

providing a target identifier corresponding to the data network client at the mobile communication device;

transmitting the message and the target identifier to a fixed equipment network;

routing the message and target identifier to a gateway, the gateway operably coupled to the data network; and

routing the message over the data network to the data network client.

4. A method for performing instant messaging as defined in claim 3, wherein routing the message over the data network includes routing the message to a messaging server, the data network client is a messaging client of the messaging server.

5. A method for performing instant messaging as defined in claim 3, further comprising:

generating an acknowledgement at the data network client; and

transmitting the acknowledgement back across the data network and fixed equipment network to the mobile communication device.

6. A method for performing instant messaging as defined in claim 3, further comprising:

providing the data network client with a means for generating an acknowledgement; and

displaying a failure message at the mobile communication device if no acknowledgement is received within a preselected period of time of having completed the transmitting.

7. A method for performing instant messaging as defined in claim 3, wherein displaying the failure message occurs within 5 seconds after having completed the transmitting.

8. A method for performing instant messaging between a mobile station, operating in a wireless communication system, and a network chat client operably connected to a data network, the method comprising:

authoring an message at the network chat client;

providing a target identifier corresponding to the mobile station , performed at the network chat client

transmitting the message and the target identifier from the network chat client to a chat server;

routing the message and target identifier from the chat server to a fixed equipment network through a mobile data gateway;

obtaining a present location of the mobile station corresponding to the target identifier, performed by the fixed equipment network;

routing the message to a serving cell containing the mobile station ; and

transmitting the message over an air interface from the serving cell to the mobile station.

9. A method of performing instant messaging as defined in claim 8, further comprising:

generating an acknowledgement at the mobile station ; and

transmitting the acknowledgement back across the data network and fixed equipment network to the network chat client.

10. A method for performing instant messaging as defined in claim 8, further comprising:

providing the mobile station with a means for generating an acknowledgement; and

displaying a failure message at the network chat client if no acknowledgement is received within a preselected period of time of having completed the transmitting.

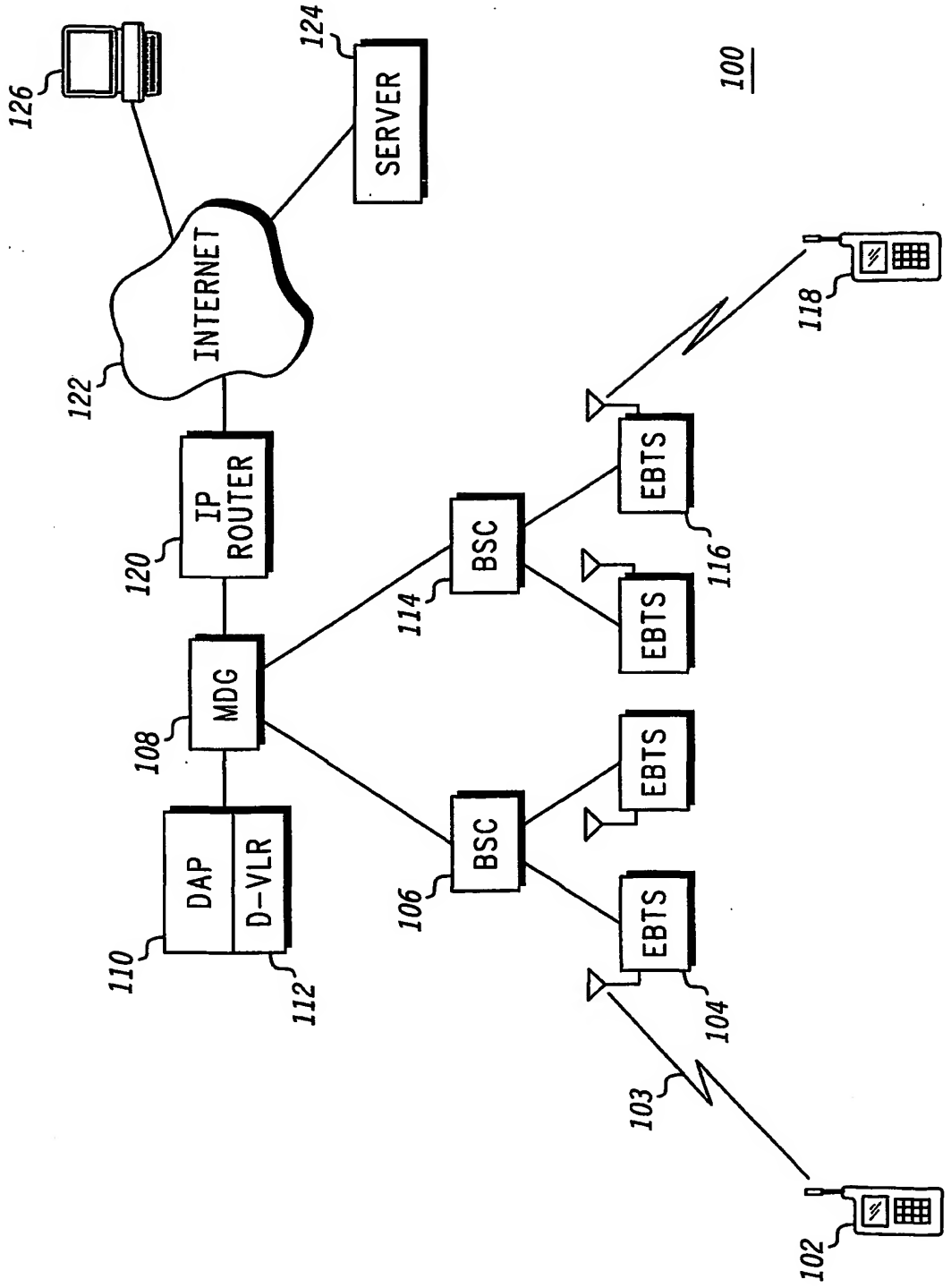
100
126
124
SERVER
INTERNET
122
IP ROUTER
120
MDG
108
DAP
D-VLR
110
112
BSC
114
BSC
106
EBTS
116
EBTS
EBTS
104
118
103
102

FIG. 1

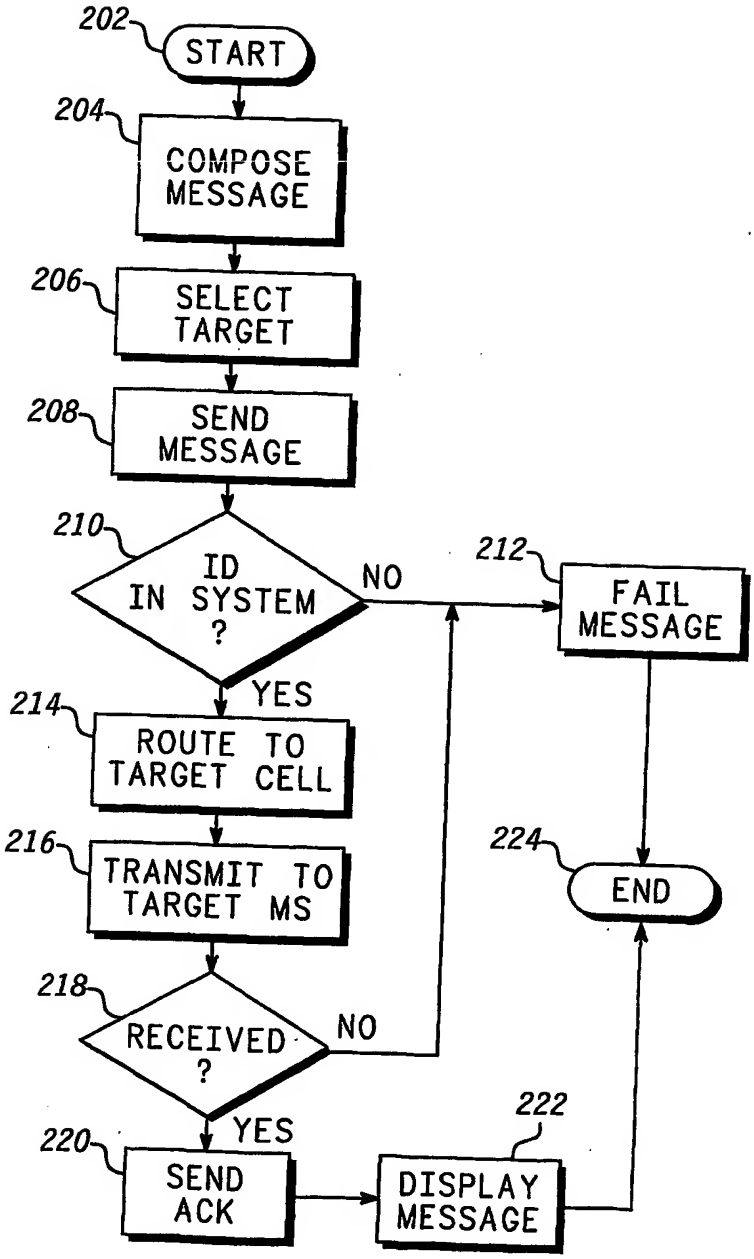
202
START
204
COMPOSE MESSAGE
206
SELECT TARGET
208
SEND MESSAGE
210
ID IN SYSTEM ?
NO
212
FAIL MESSAGE
YES
214
ROUTE TO TARGET CELL
216
TRANSMIT TO TARGET MS
218
RECEIVED ?
NO
YES
220
SEND ACK
222
DISPLAY MESSAGE
224
END
200

FIG. 2

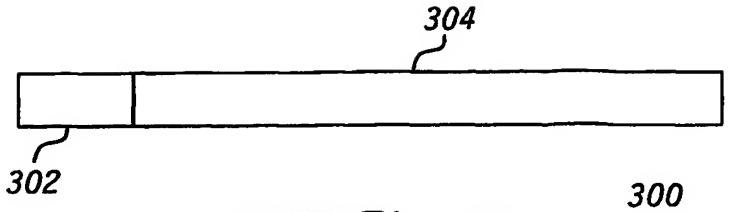
304
302
300

FIG. 3

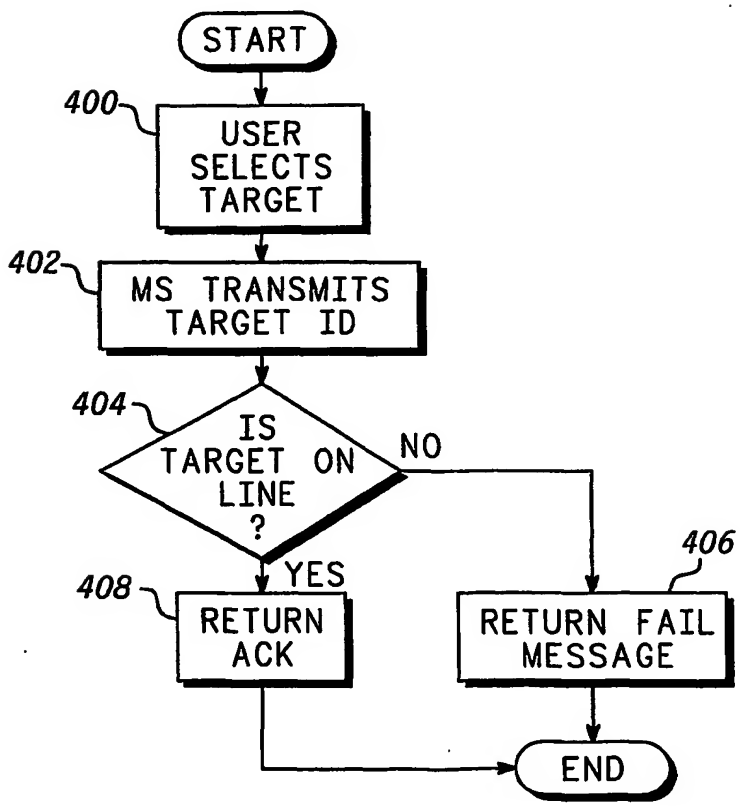
START
400
USER SELECTS TARGET
402
MS TRANSMITS TARGET ID
404
IS TARGET ON LINE ?
NO
YES
406
408
RETURN ACK
RETURN FAIL MESSAGE
END

FIG. 4

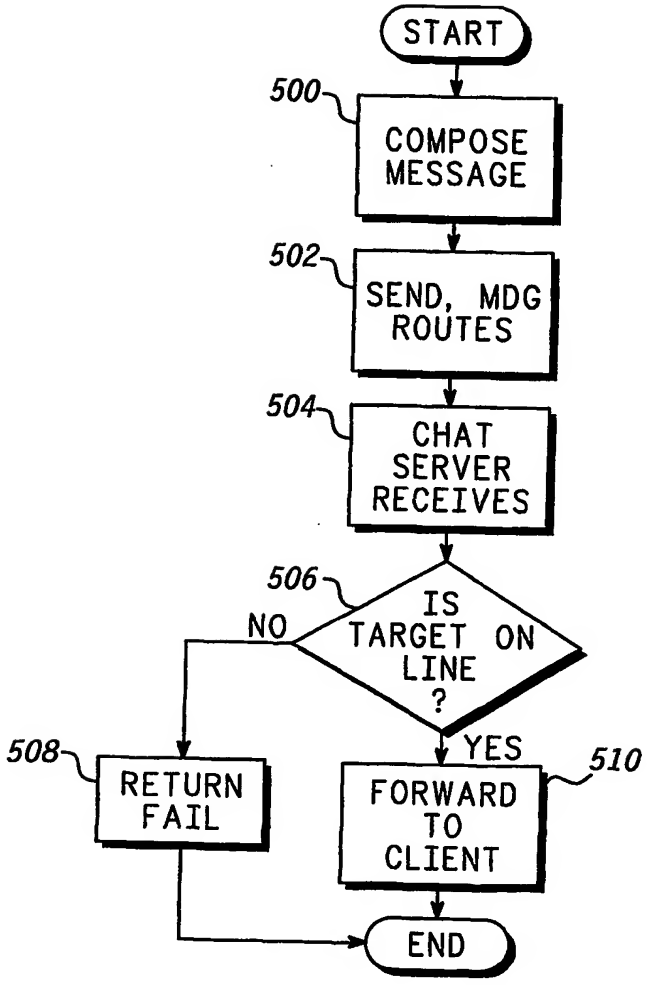
START
500
COMPOSE MESSAGE
502
SEND, MDG ROUTES
504
CHAT SERVER RECEIVES
506
IS TARGET ON LINE ?
NO
YES
508
RETURN FAIL
510
FORWARD TO CLIENT
END

FIG. 5

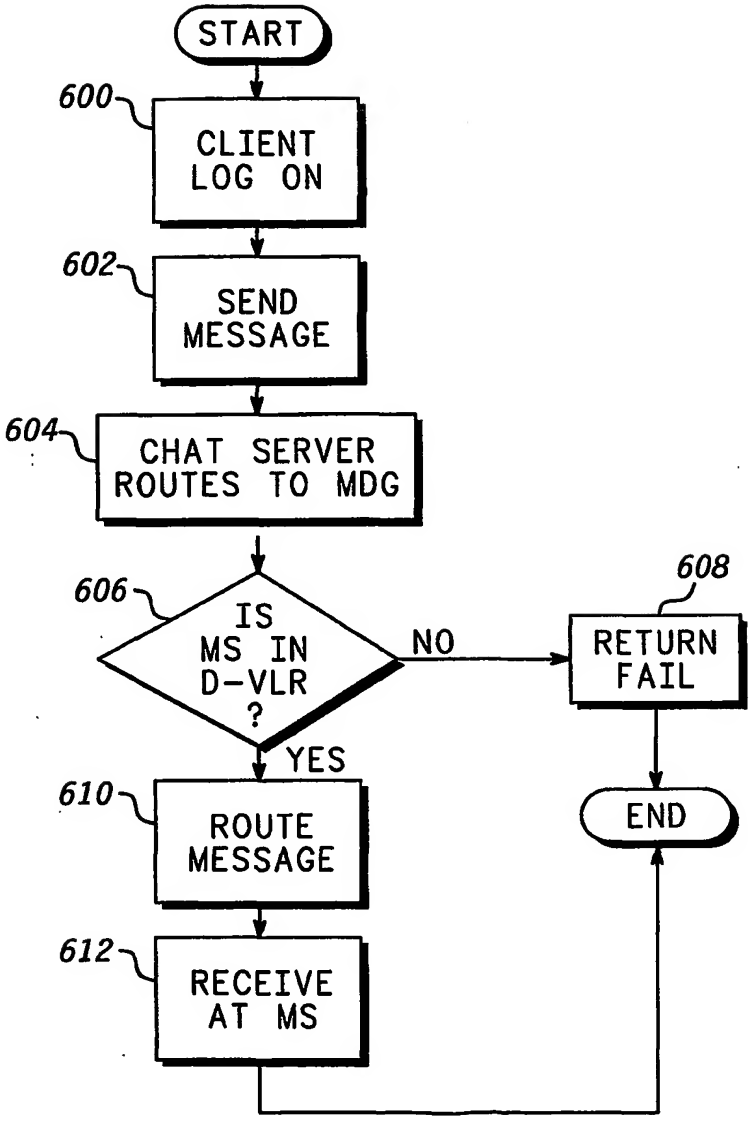
START
600
CLIENT LOG ON
602
SEND MESSAGE
604
CHAT SERVER ROUTES TO MDG
606
IS MS IN D-VLR ?
NO
608
RETURN FAIL
YES
610
ROUTE MESSAGE
END
612
RECEIVE AT MS

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/16939

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 13/00, 17/60
US CL : 455/466; 713/201
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/466; 713/201

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IEEE Transactions On Communications

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
ONLINE (internet)
search terms: wireless instant messaging, SMS and instant messaging

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FALL 2001 PRESENCE AND INSTANT MESSAGING (PIM). The Marriage of SMS and Instant Messaging	1-10
A	ANTEPO PRESS RELEASE. Antepo Unviels J2ME (JAVA 2 Micro Edition) Instant messaging solution for wireless carriers and handset manufacturers. June 21, 2001.	1-10

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 24 AUGUST 2001	Date of mailing of the international search report 10 OCT 2001
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